

## Claims

- 1           1.       A process for fabricating a microelectrode, comprising: a) providing a  
2 substrate comprising at least one polymer micro-ridge, wherein the polymer micro-ridge  
3 comprises an upper surface and two walls, the two walls forming an angle with a lower  
4 surface; b) depositing a metal thin film on the upper surface, the two walls, and the lower  
5 surface; and c) etching a predetermined amount of the deposited metal thin film on the  
6 lower surface to form the microelectrode.
  
- 1           2.       The process of Claim 1, wherein etching a predetermined amount of the  
2 deposited metal thin film on the lower surface comprises wet etching, dry etching, ion  
3 beam bombardment, or any combination thereof.
  
- 1           3.       The process of Claim 1, wherein providing the substrate comprising at  
2 least one polymer micro-ridge comprises molding, imprinting, photolithographic  
3 patterning, imprint lithography, or any combination thereof.
  
- 1           4.       The process of Claim 1, wherein providing the substrate comprising at  
2 least one polymer micro-ridge comprises dry etching a polymer thin film.
  
- 1           5.       The process of Claim 1, wherein the polymer micro-ridge comprises a  
2 linear polymer, a crosslinked polymer, an organically modified sol-gel, or any  
3 combination thereof.
  
- 1           6.       The process of Claim 1, wherein the lower surface comprises silicon  
2 dioxide.
  
- 1           7.       The process of Claim 1, wherein the lower surface comprises a polymer.
  
- 1           8.       The process of Claim 7, wherein the lower surface comprises a linear  
2 polymer, a crosslinked polymer, an organically modified sol-gel, or any combination  
3 thereof.
  
- 1           9.       The process of Claim 1, wherein the polymer micro-ridge and the lower  
2 surface comprises the same polymer.

1           10.     The process of Claim 1, wherein the angle between the two walls and the  
2 lower surface is about 90 degrees.

1           11.     The process of Claim 1, wherein the upper surface and lower surface are  
2 substantially parallel.

1           12.     The process of Claim 11, wherein the walls are substantially perpendicular  
2 to the upper surface and the lower surface.

1           13.     The process of Claim 1, wherein the substrate comprises a plurality of  
2 polymer micro-ridges.

1           14.     The process of Claim 13, wherein the micro-ridges are interdigitated.

1           15.     The process of Claim 1, wherein the metal thin film is selected from the  
2 group consisting of gold, platinum, titanium, and any combination thereof.

1           16.     The process of Claim 1, wherein depositing the metal thin film according  
2 to a process comprises physical vapor deposition, thermal evaporation, electroplating, or  
3 any combination thereof.

1           17.     A process for fabricating a microelectrode comprising: a) providing a  
2 substrate comprising at least one polymer micro-ridge, wherein the polymer micro-ridge  
3 comprises an upper surface and at least one wall, the wall forming an angle with a lower  
4 surface; b) depositing a metal thin film on the upper surface, the wall, and the lower  
5 surface; c) etching a predetermined amount of the deposited metal thin film on the lower  
6 surface or the deposited metal thin film on the upper surface; and d) etching a  
7 predetermined amount of the other of the deposited metal thin film on upper surface or  
8 the deposited metal thin film on the lower surface, thereby leaving a metal thin film on  
9 the wall.

1           18.     The process of Claim 17, wherein etching a predetermined amount of the  
2 deposited metal thin film on the lower surface, upper surface, or both according to a  
3 process comprises wet etching, dry etching, ion beam bombardment, or any combination  
4 thereof.

1           19.     The process of Claim 17, comprising first etching a predetermined amount  
2 of the deposited metal thin film on the upper surface, and then etching a predetermined  
3 amount of the deposited metal thin film on the lower surface.

1           20.     The process of Claim 17, comprising first etching a predetermined amount  
2 of the deposited metal thin film on the lower surface, and then etching a predetermined  
3 amount of the deposited metal thin film on the upper surface.

1           21.     The process of Claim 17, wherein providing the substrate comprising at  
2 least one polymer micro-ridge comprises molding, imprinting, photolithographic  
3 patterning, imprint lithography, or any combination thereof.

1           22.     The method of Claim 17, wherein providing the substrate comprising at  
2 least one polymer micro-ridge comprises dry etching a polymer thin film.

1           23.     The process of Claim 17, wherein the polymer micro-ridge comprises a  
2 linear polymer, a crosslinked polymer, an organically modified sol-gel, or any  
3 combination thereof.

1           24.     The process of Claim 17, wherein the lower surface comprises silicon  
2 dioxide.

1           25.     The process of Claim 17, wherein the lower surface comprises a polymer.

1           26.     The process of Claim 25, wherein the lower surface comprises a linear  
2 polymer, a crosslinked polymer, an organically modified sol-gel, or any combination  
3 thereof.

1           27.     The process of Claim 17, wherein the polymer micro-ridge and the lower  
2 surface comprise the same polymer.

1           28.     The process of Claim 17, wherein the angle between the two walls and the  
2 lower surface is about 90 degrees.

1           29.     The process of Claim 17, wherein the upper surface and lower surface are  
2 substantially parallel.

1           30.     The process of Claim 29, wherein the walls are substantially perpendicular  
2 to the upper surface and the lower surface.

1           31.     The process of Claim 17, wherein the substrate comprises a plurality of  
2 polymer micro-ridges.

1           32.     The process of Claim 31, wherein the polymer micro-ridges are  
2 interdigitated.

1           33.     The process of Claim 17, wherein the metal thin film is selected from the  
2 group consisting of gold, platinum, titanium, and any combination thereof.

1           34.     The process of Claim 17, wherein depositing the metal thin film according  
2 to a process comprises physical vapor deposition, thermal evaporation, electroplating, or  
3 any combination thereof.